Stoller
Hanford Office

HGLP-LDR-025

299-W10-21 (A5440)
Log Data Report

Borehole Information:

Borehole:	299-W10-21 (A5440)			Site:	218-W-3AE Burial Ground
Coordinates (WA St Plane)		GWL[1] (ft):	232.3	GWL Date:	10/10/06
North	East	Drill Date	Elevation (ft) (TOC)	Total Depth (ft)	Type
137154.721	566583.991	08/93	677.5	230	Air Rotary

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Stainless steel	2.0	6 5/8	6 3/8	1/8	2.0	14
Stainless steel	1.0	4 5/8	4 3/8	1/8	1.0	229

Borehole Notes:

Casing diameter and stickup measurements were acquired using a caliper and steel tape. Logging data acquisition is referenced to the top of casing (TOC). The well construction and completion summary provides the following information (all depths are below-ground-surface). A 13"-diameter cement surface seal extends to 11.4 ft. The annulus diameter changes from 13" (0 to 14 ft) to 11" (14 to 143.85 ft) to 9" (143.85 ft to bottom). The annulus around the 4" casing is filled with bentonite crumbles to 201.2 ft, ¼" bentonite pellets from 201.2 to 204.9 ft, and 20-40 silica sand from 204.9 to 233.1 ft. A bentonite plug was emplaced from 233.1 to 237.1 ft. 4" stainless steel wire-wrap screen is in place from 209.25 to 229.25 ft. The screen is capped with a 4" PVC cap.

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System:	Gamma 1G		Type:	SGLS (35%) SN: 34TP10951A
Effective Calibration Date:	11/29/05	Calibration Reference:	DOE/EM-GJ1052-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3	4	5 Repeat
Date	10/09/06	10/10/06	10/11/06	10/12/06	10/12/06
Logging Engineer	McClellan	McClellan	McClellan	McClellan	McClellan
Start Depth (ft)	2.0	75.0	144.0	219.0	108.0
Finish Depth (ft)	76.0	145.0	220.0	230.0	85.0
Count Time (sec)	200	200	200	200	200
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	1.0	1.0	1.0	1.0	1.0
ft/min	N/A[2]	N/A	N/A	N/A	N/A
Pre-Verification	AG113CAB	AG114CAB	AG115CAB	AG116CAB	AG116CAB
Start File	AG113000	AG114000	AG115000	AG116000	AG116012
Finish File	AG113074	AG114070	AG115076	AG116011	AG116035
Post-Verification	AG113CAA	AG114CAA	AG115CAA	AG116CAA	AG116CAA
Depth Return Error (in.)	0.0	1.5 LOW	1.5 LOW	N/A	1.7 LOW
Comments	No fine-gain	No fine-gain	No fine-gain	No fine-gain	No fine-gain

Log Run	1	2	3	4	5 Repeat
	adjustment	adjustment	adjustment	adjustment	adjustment. Repeat section

Logging Operation Notes:

Logging was conducted without a centralizer on the sonde. A repeat section was collected to evaluate the logging system's performance.

Analysis Notes:

Analyst:	Pope	Date:	10/26/06	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging systems were performed before and after the day's data acquisition. All acceptance criteria were met.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet template identified as G1GNov05.xls. A casing correction for 0.25-in. thick casing was applied to the SGLS data from 0 to 14 ft. A casing correction for 0.125-in. thick casing was applied to data from 15 ft to the bottom of the borehole. A correction for water was not required, as the depth to water is below the lowest depth achieved with the sonde.

Results and Interpretations:

^{137}Cs was detected by the SGLS during logging of this borehole from 3 to 5 ft. The maximum concentration is approximately 0.4 pCi/g at 5 ft. ^{137}Cs was also identified at 97, 133, and 206 ft at concentrations just above the MDL (approx. 0.2 pCi/g), but visual inspection of the spectra from those depths suggests they are statistical fluctuations.

The natural gamma logs (^{40}K, ^{238}U, and ^{232}Th) are dominated by borehole completion materials, which are described in the borehole notes section of this report. It is not possible to conclusively discriminate between influences from the completion materials and influences from the formation on the KUTh concentrations. Most sharp changes in character are coincident with changes in borehole geometry and completion materials (noted on the plots). Other variability seen in the logs might be attributable to such things as lithology changes, void spaces in the formation (probably filled with bentonite), or void spaces where the bentonite bridged.

Westinghouse Hanford Company logged this borehole twice on 07/30/1993 and twice on 08/9/1993 with the Radionuclide Logging System (RLS), employing a NaI detector for gross-gamma measurements. The first casing string (11"-diameter) was in place during the earlier logs; the first and second (9"-diamter) casing strings during the later logs. The borehole was not completed during these logs, and they therefore probably provide a better indication of gross changes in lithology than the 2006 log. A comparison plot of these logs and the SGLS gross-gamma log is provided.

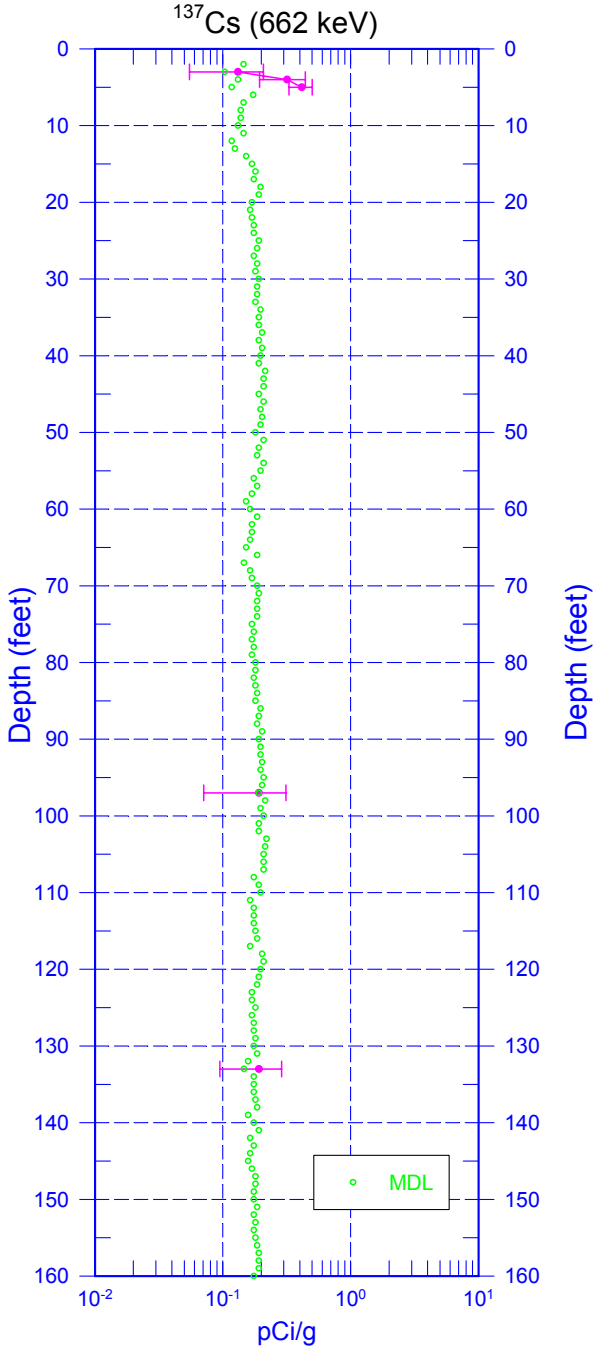
The repeat section (85 to 108 ft) for the SGLS indicates good agreement for the naturally occurring radionuclides. Identification of ^{137}Cs in the repeat section at 105 ft (concentration just above the MDL) is concluded to be spurious based on visual inspection of the spectrum from that depth. ^{137}Cs was not identified at 96 ft in the repeat section.

List of Plots:

Man-Made Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma and Dead Time
SGLS/RLS Comparison
Repeat Section for Man-Made Radionuclides
Repeat Section of Natural Gamma Logs

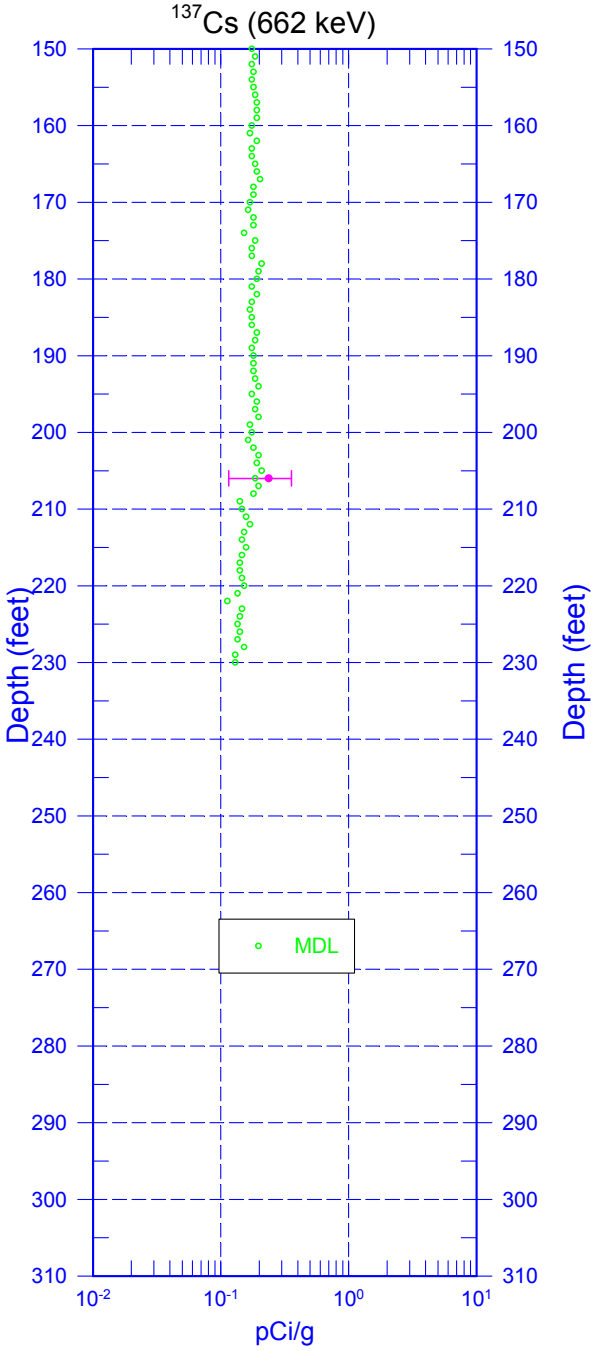
[1] GWL – groundwater level
[2] N/A – not applicable

299-W10-21 (A5440)
Man-Made Radionuclides



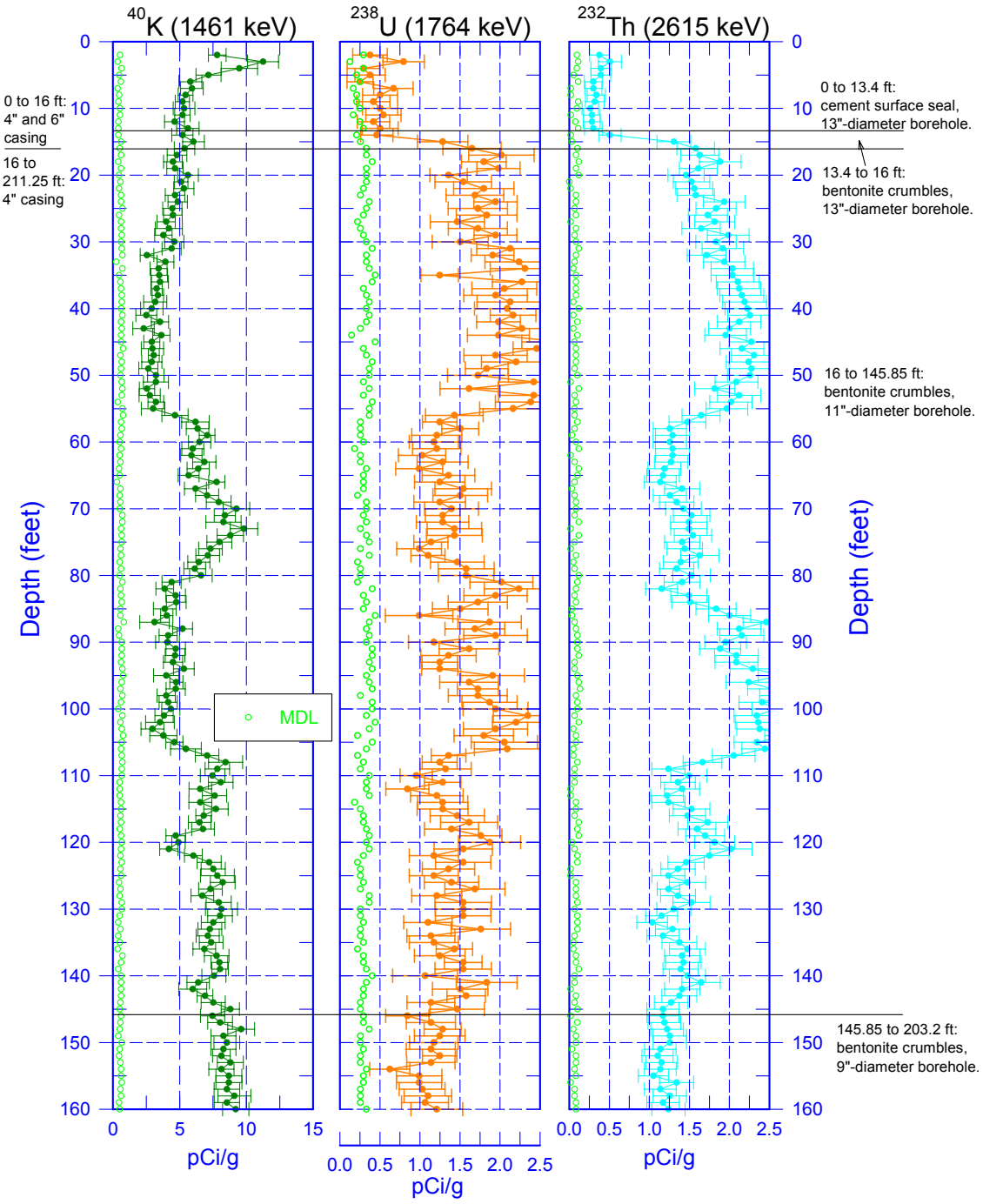
Zero Reference - Top of Casing

299-W10-21 (A5440)
Man-Made Radionuclides



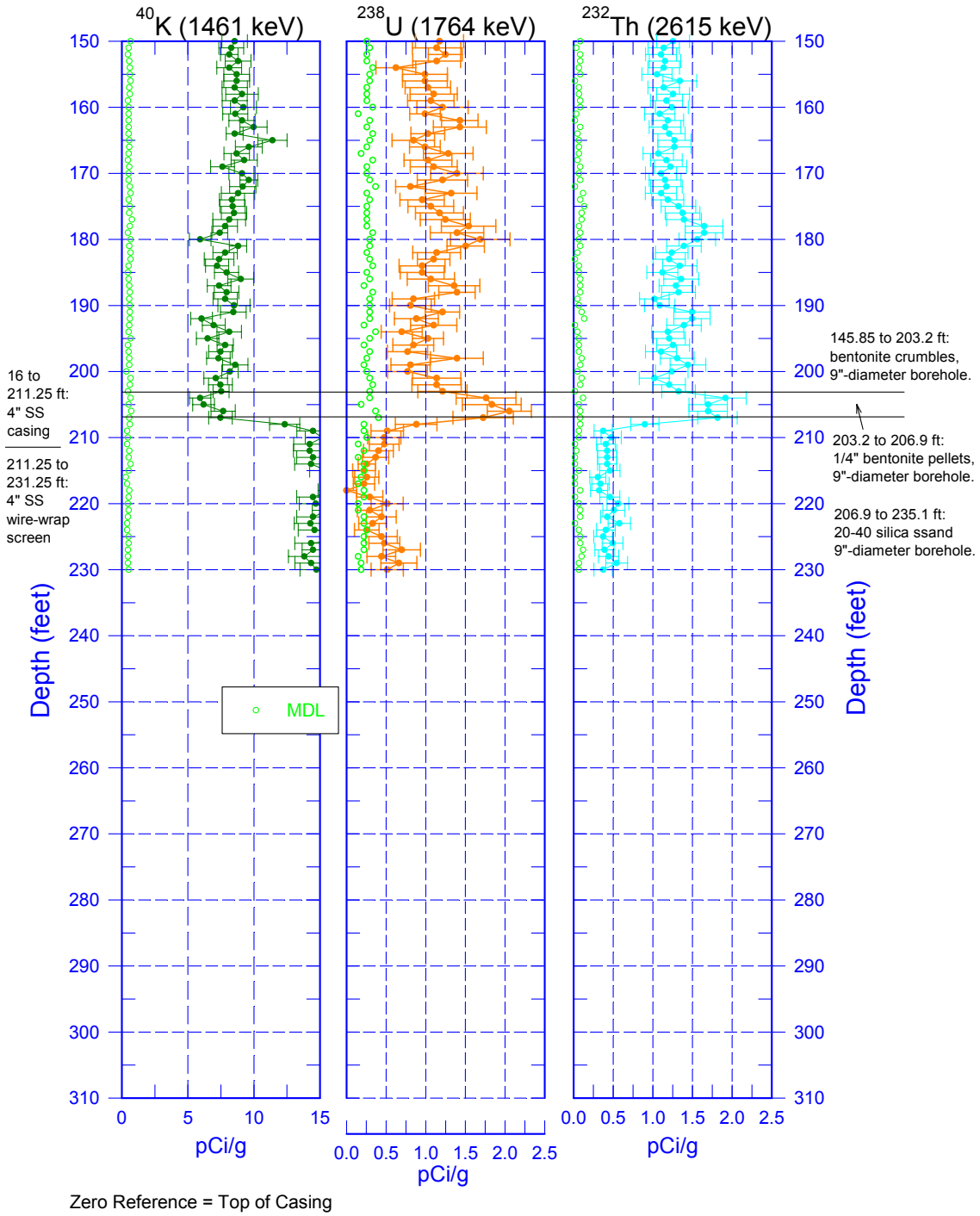
Zero Reference - Top of Casing

299-W10-21 (A5440)
Natural Gamma Logs



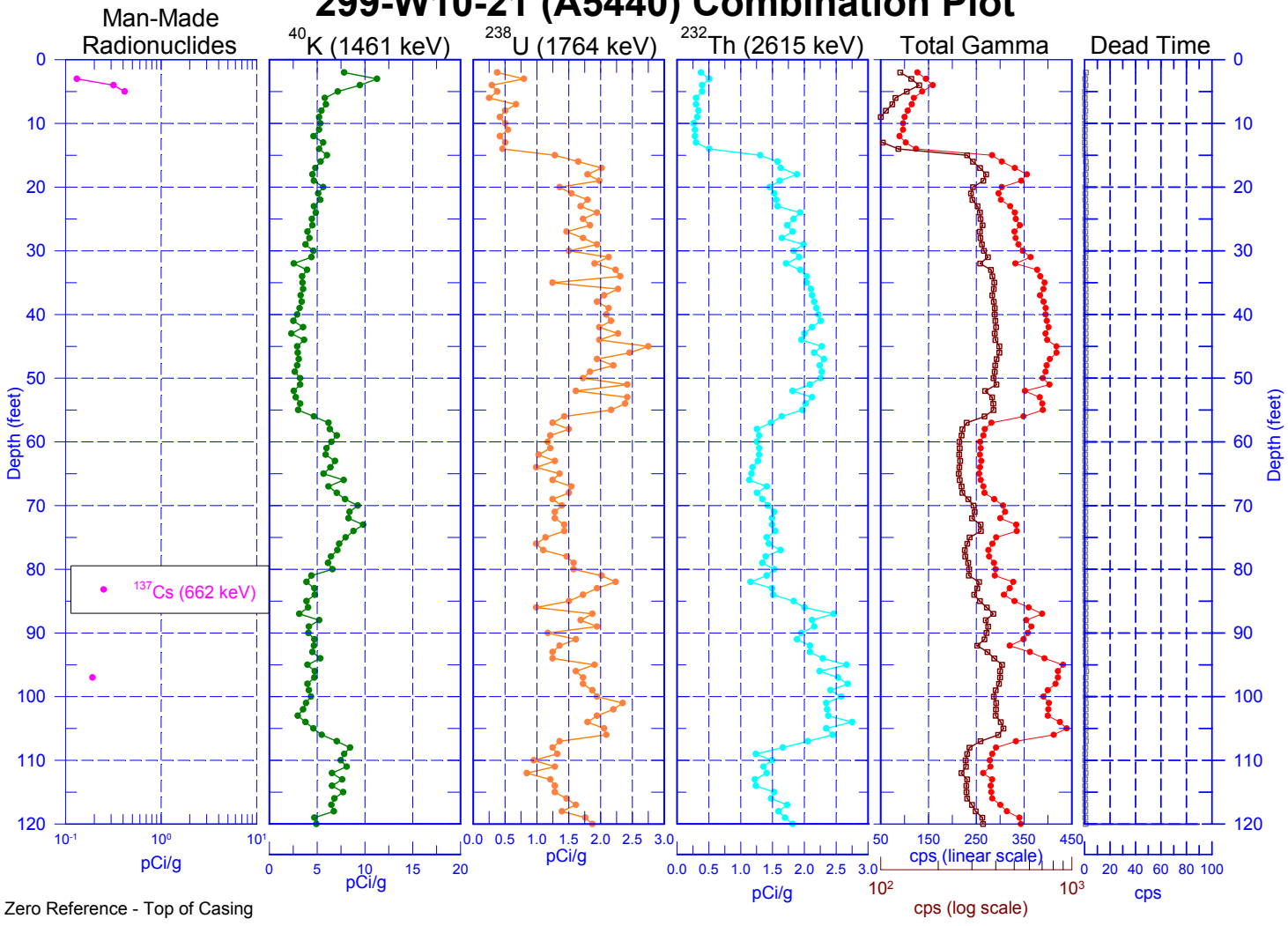
Zero Reference = Top of Casing

299-W10-21 (A5440)
Natural Gamma Logs

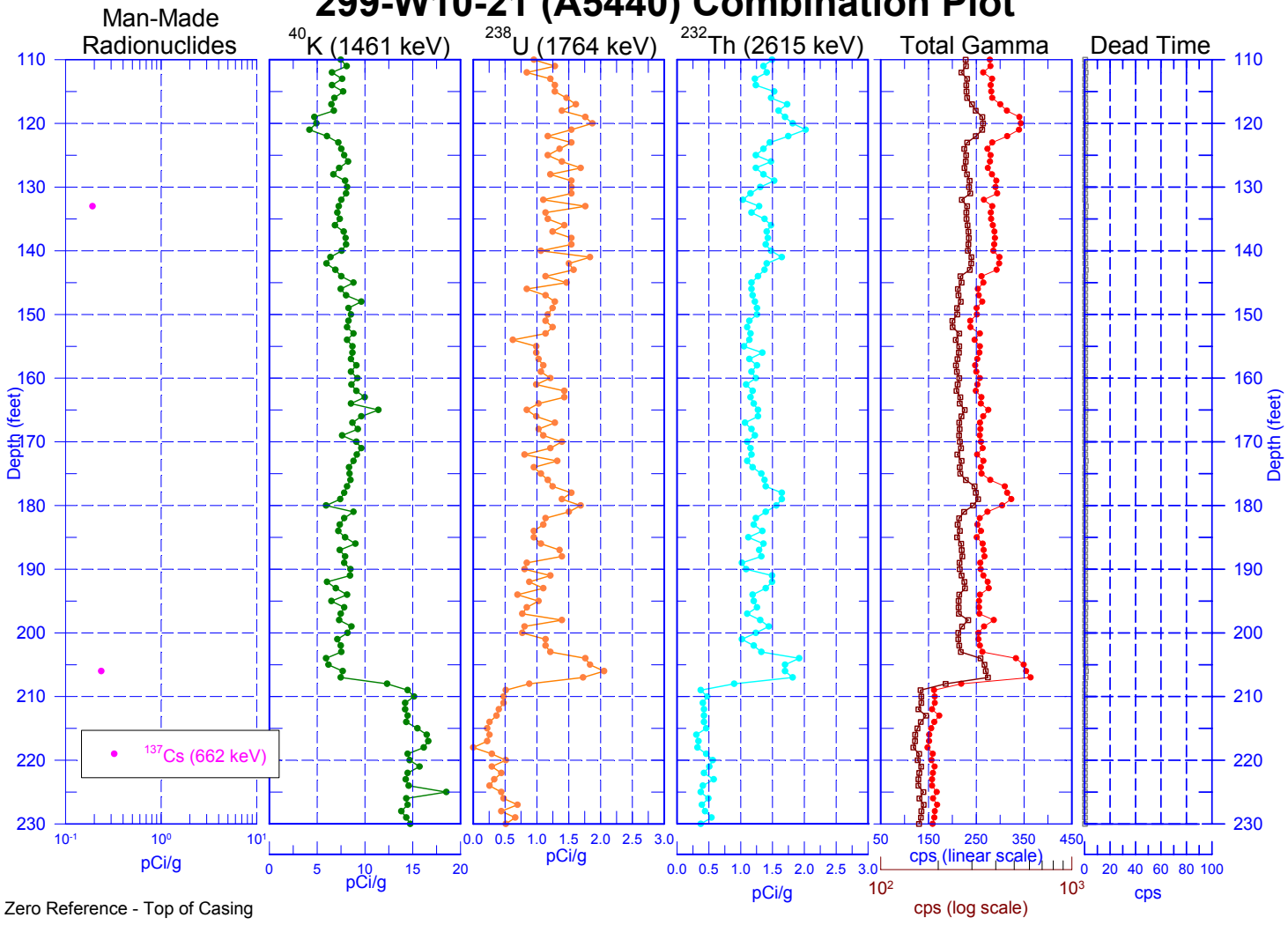


Zero Reference = Top of Casing

299-W10-21 (A5440) Combination Plot

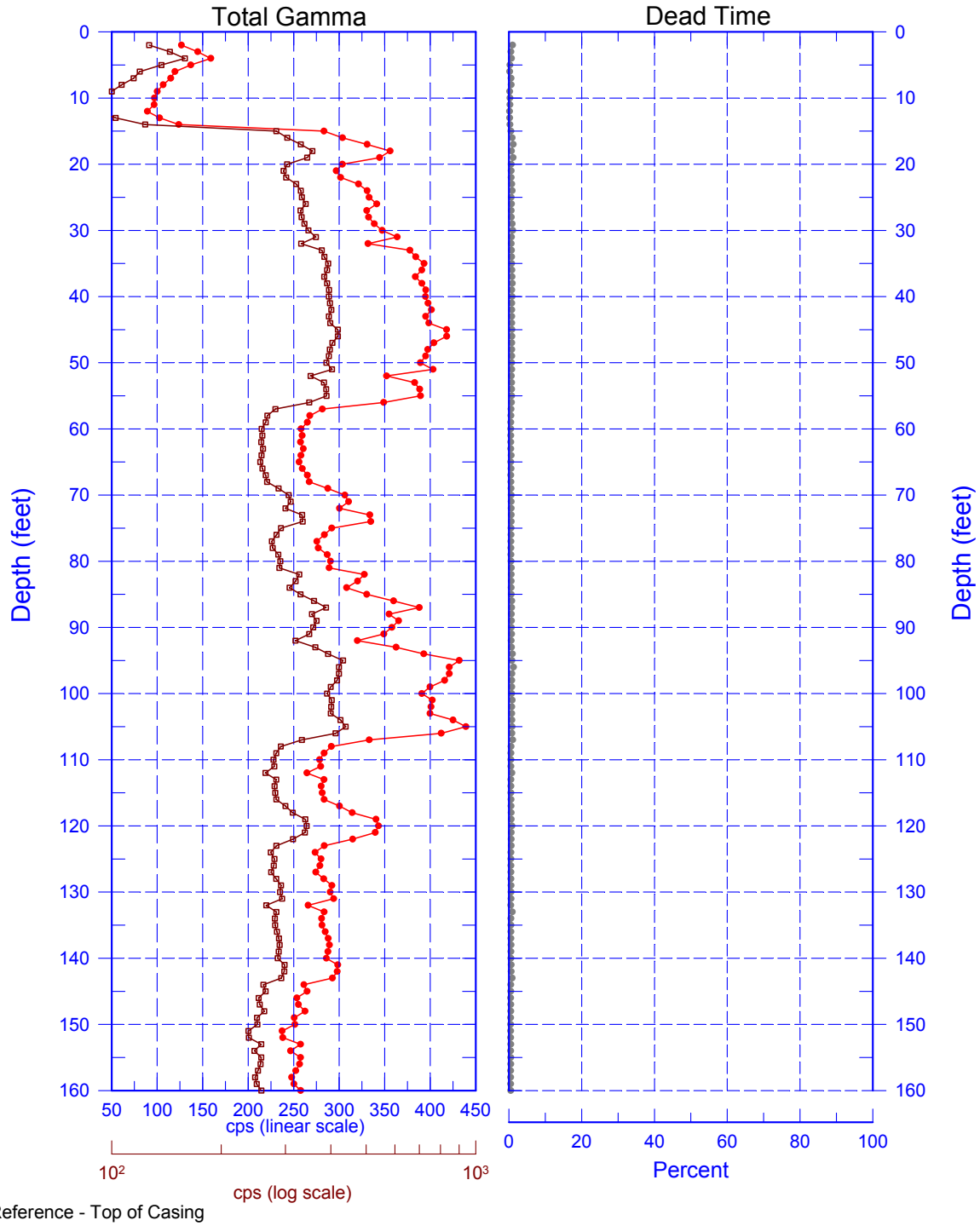


299-W10-21 (A5440) Combination Plot



Zero Reference - Top of Casing

299-W10-21 (A5440)
Total Gamma & Dead Time



Reference - Top of Casing

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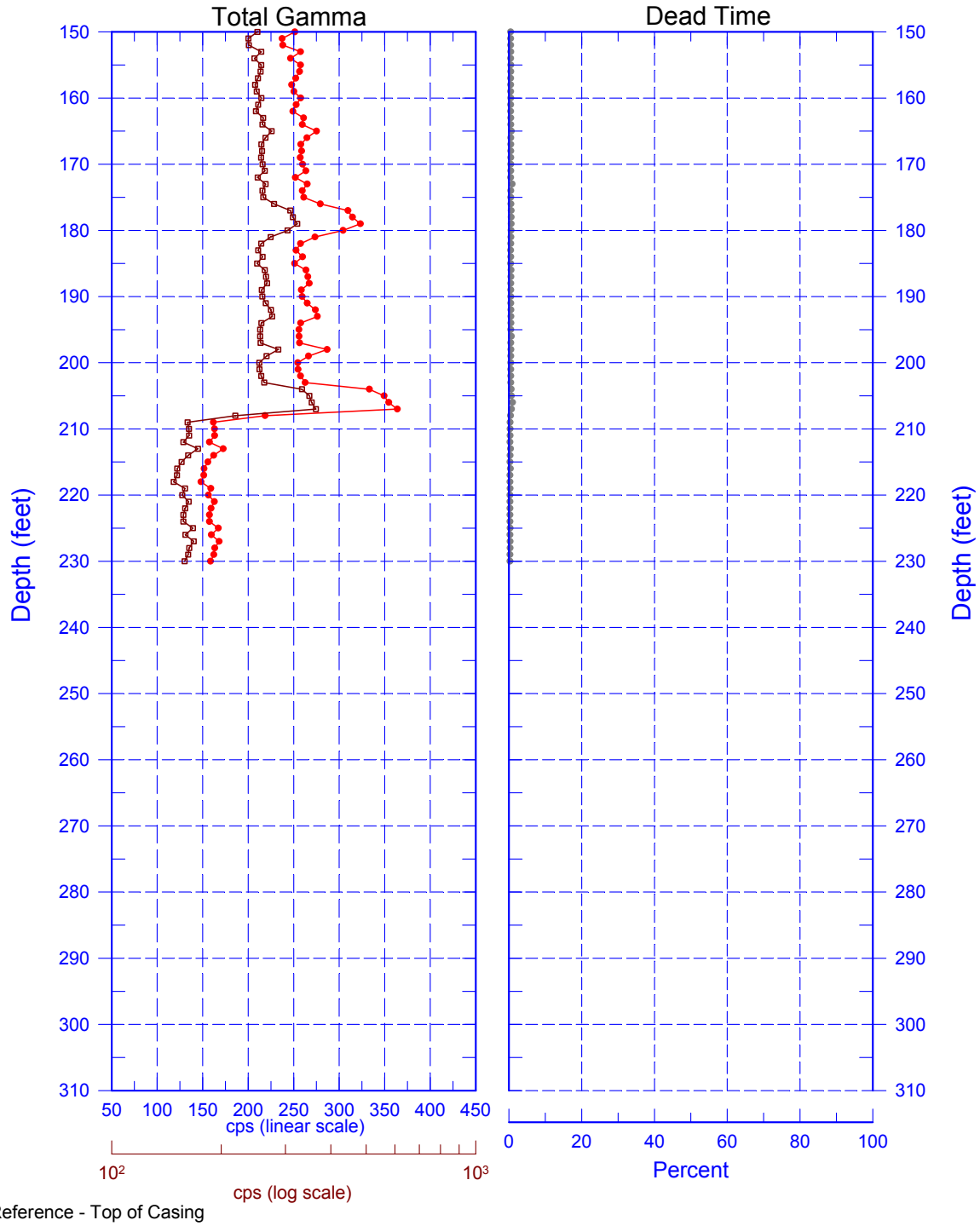
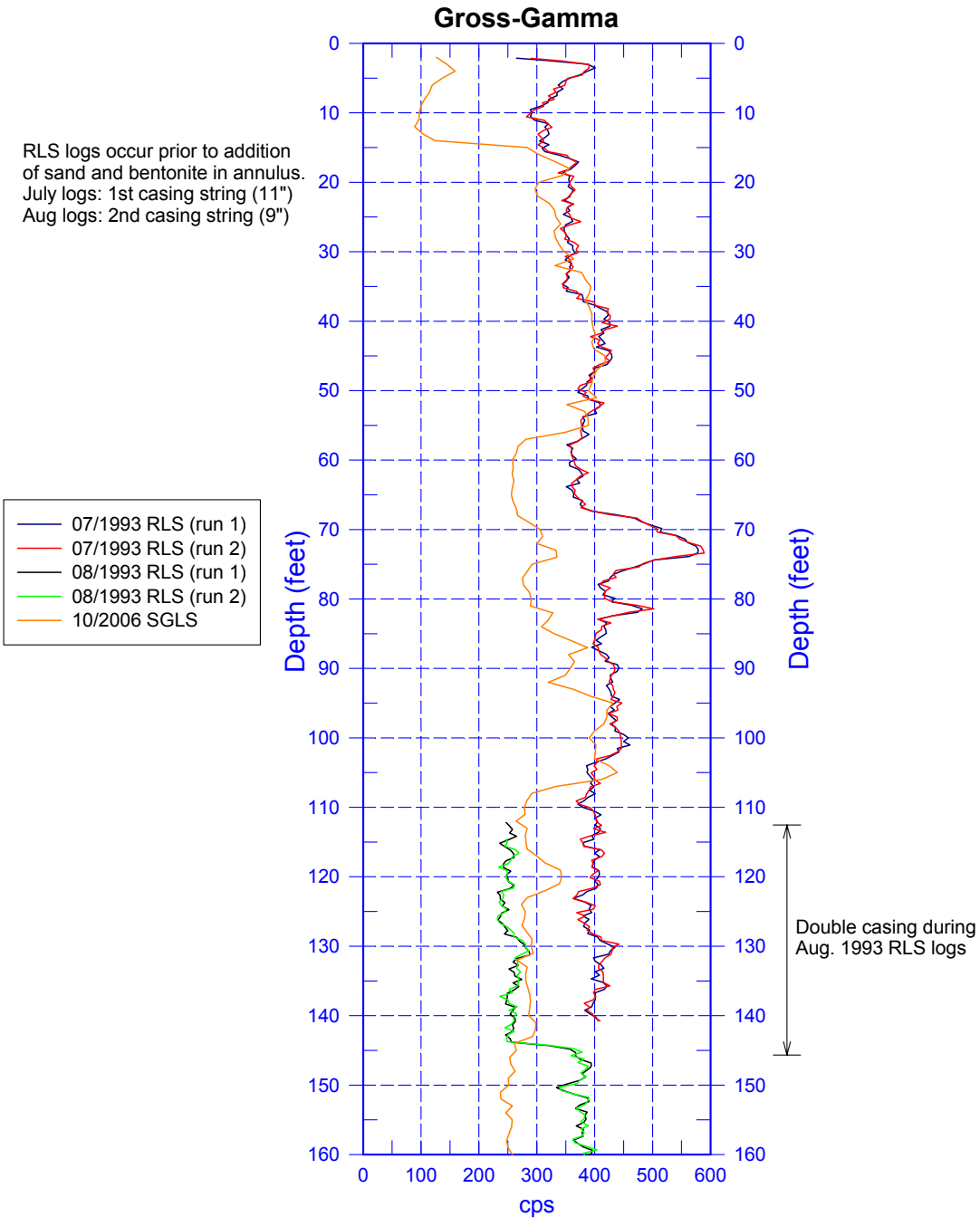
Total Gamma & Dead Time



Reference - Top of Casing

299-W10-21 (A5440)
SGLS/RLS Comparison



Zero Reference - Top of Casing

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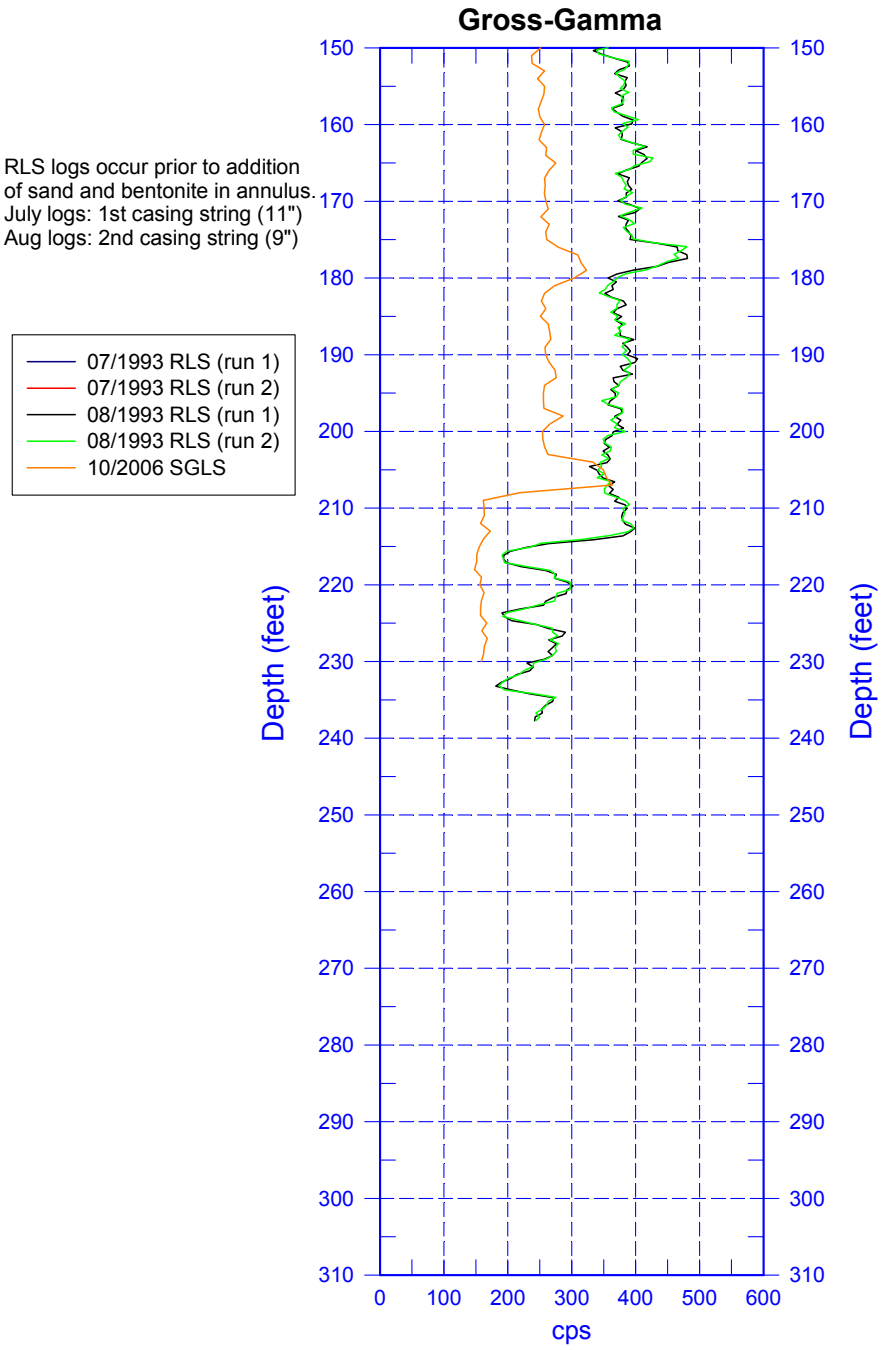
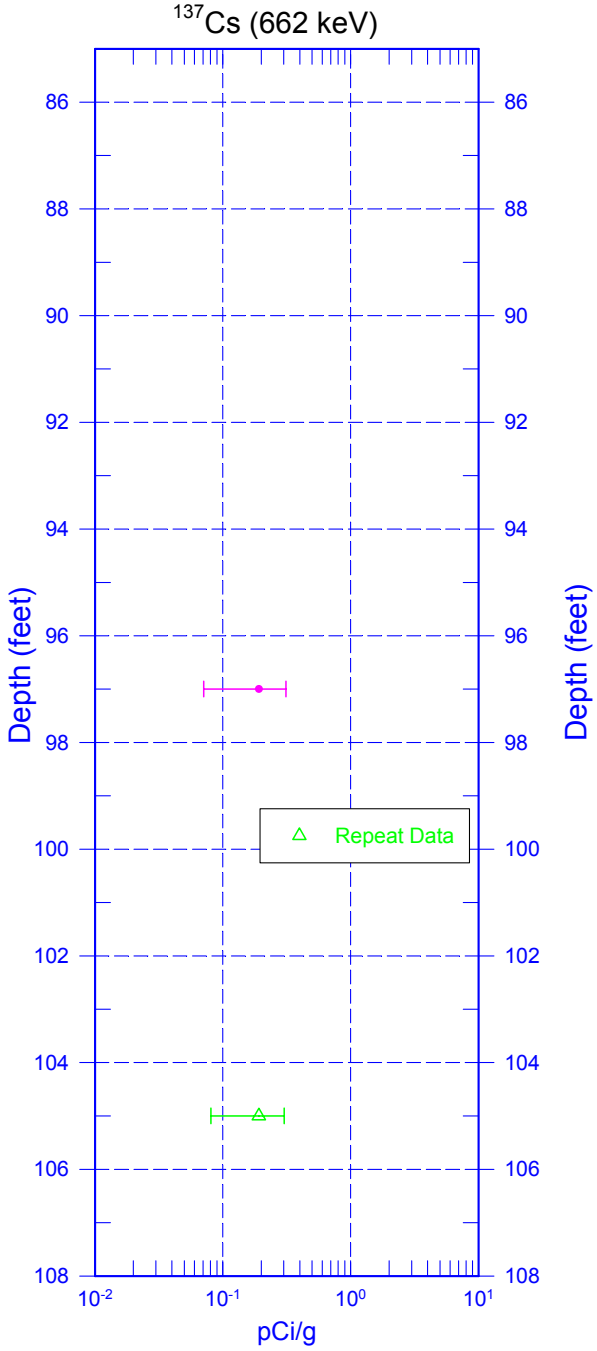
SGLS/RLS Comparison



Zero Reference - Top of Casing

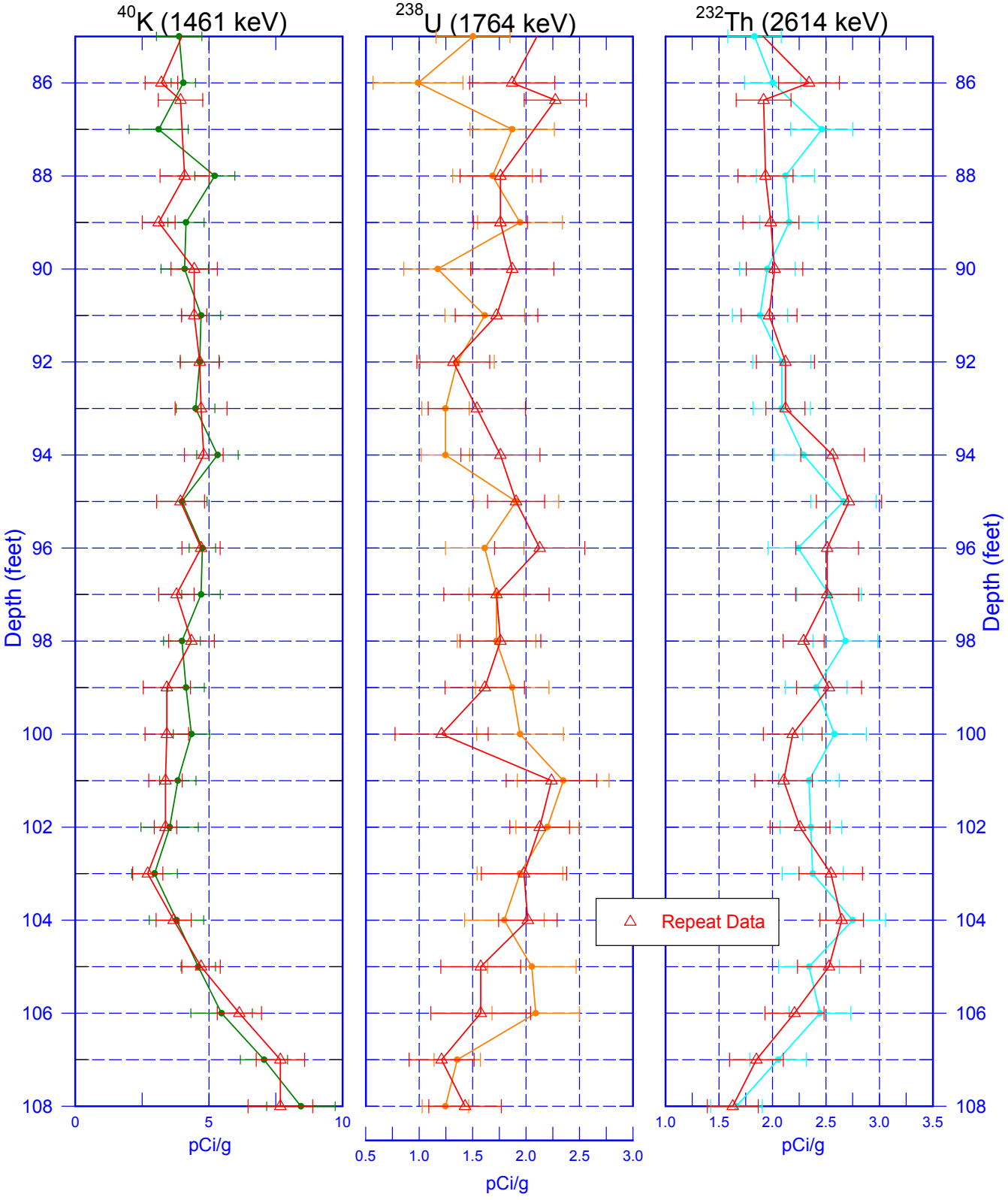
299-W10-21 (A5440)
Repeat Section for Man-Made Radionuclides



Zero Reference - Top of Casing

299-W10-21 (A5440)

Repeat Section of Natural Gamma Logs



Zero Reference - Top of Casing